

STUDIES IN THE FLORA OF ARABIA XXIII:
Five new species from Oman

A. G. MILLER & J. A. BIAGI

ABSTRACT. Five new species from Oman are described and illustrated: *Raphionacme arabica* A. G. Miller & J. A. Biagi (Asclepiadaceae), *Blepharis dhofarensis* A. G. Miller (Acanthaceae), *Dyschoriste dalyi* A. G. Miller (Acanthaceae), *Hyoscyamus gallagheri* A. G. Miller & J. A. Biagi (Solanaceae), and *Withania qaraitica* A. G. Miller & J. A. Biagi (Solanaceae).

INTRODUCTION

The five species described here are all endemic to Dhofar, the southern region of Oman, and add to the existing list of remarkable endemics found in the area. The total flora of Dhofar is c.750 species of which c.50 are endemic and a further 20 restricted to Dhofar and adjacent parts of S Yemen. In Arabia, Dhofar is unique for the luxuriance of the woodlands which clothe its south-facing escarpment mountains. These mountains, which extend in a crescent-shaped arc for about 200km along the coast, are shrouded in thick mists from June to mid-September each year. The mists rarely penetrate more than 30km inland and thus this small island of green is bounded by sparsely vegetated desert steppe to the west, north and east and the Indian ocean to the south. Four of the species described here occur in the wet woodlands or the surrounding areas which receive partial benefit from the mists. The fifth species occurs further to the north along the coast of central Oman, a much more arid and sparsely vegetated area. These coastal areas of central Oman receive most of their precipitation not from the moisture laden winds of the SW monsoon (as do the escarpment mountains of the south) but from frequent thick mists which roll in from the Indian Ocean mainly in the spring and autumn.

Raphionacme arabica A. G. Miller & J. A. Biagi, **sp. nov.** Fig. 1.

A *R. abyssinica* Chiovenda foliis latioribus, caulibus non volubilibus differt; a *R. brownii* Scott-Elliot tubo corollae brevior, foliis latioribus recedit.

Erect herb, arising from a swollen tuberous base, all parts producing white latex when cut; tubers subglobose to fusiform, 2-6cm diam. \times 3-10cm deep, brownish white; stem annual, up to 20cm tall, reddish brown, covered with short, patent, white hairs. *Leaves* opposite, often appearing as a whorl of 4 at first, 2.6-4.5 \times 1.3-3.5cm, elliptic to obovate to oblong-ovate, tip acute to obtuse, margin entire and minutely ciliate, base acute, upper and lower surfaces pubescent, veins reddish brown, green above, paler green or reddish tinged beneath, petiole 4-10mm. *Inflorescence* terminal, well exceeding the upper leaves, dichotomously forked below, densely flowered and corymbose above. *Pedicels* 1.5-2.5mm long. *Bracts* oblong, green with pale margin, 1-3 \times 0.5-0.75mm. *Sepals* 1-1.8 \times 0.6-1mm, oblong-ovate to triangular, tip acute to rounded, pubescent. *Corolla tube* c.1mm long; corolla lobes, erect spreading, white above with pinkish

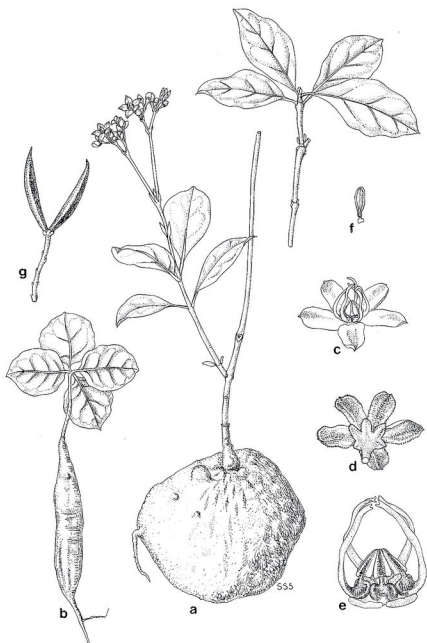


FIG. 1. *Raphionacme arabica*: a, habit $\times \frac{1}{3}$; b, habit $\times \frac{1}{3}$; c, flower $\times 3$; d, flower viewed from beneath $\times 3$; e, column showing erect coronal lobes (one removed) and anthers $\times 7$; f, translator $\times 7$; g, immature fruit $\times 1$.

purple central stripe in upper half and green tinged towards base, brownish purple beneath with white margin and pink-tinged tip, oblong-obovate, 5–8.5 × 1.6–2.5 mm, retuse, outer surface pubescent, glabrous within. *Corona lobes* brownish purple with green tips, fused to base of corolla lobes, linear-oblong, 4–6 mm long, entire or shortly bifid at tip, base with rounded process on either side. *Stamens* attached to the inner base of the corona, filament c. 0.3 mm long; anther c. 1.4 × 0.6 mm, ovate with an acute sterile tip. *Central column* 2 × 1 mm, tip cone-shaped, translators c. 0.8 mm long. *Immature fruits* paired, erect mature fruits and seeds unknown.

Type: Oman, Dhofar, deep dry wadi, 10 km E of Taqah, 11 i 1985, *I. M. McLeish* 480 (holo. E).

SULTANATE OF OMAN. Dhofar, J. Qara, Khaftawt road, limestone pavement in dry escarpment woodland, 850 m, 2 viii 1985, *Miller* 7214 (E); J. Nashib, 9 v 1986, *M. Morris* 588 (E).

R. arabica grows in open rocky and stony areas on the limestone escarpment mountains and coastal cliffs in areas receiving the benefit of the mists from the SW monsoon. *Raphionacme* (Asclepiadaceae—Periplocoideae) is a genus of c. 30 species restricted to Africa with most species occurring in the southern half of the continent—thus the discovery of *R. arabica* in southern Arabia is of particular interest. *Raphionacme* awaits a modern revision and therefore until then it is difficult to work out the affinities of *R. arabica* within the genus. A comparison with the limited material available at Edinburgh (E) suggests that it is nearest to the West African species *R. brownii* Scott-Elliot: corolla tube 4 mm (versus 1 mm), corolla lobes 4 mm (versus 5–8.5 mm long), coronal lobes c. 6 mm (versus 4–6 mm long), leaves linear (not elliptic to oblong-ovate). The closest species geographically is *R. abyssinica* Chiov. (from Ethiopia) which differs in several points but most obviously in the twining stems and narrowly elliptic leaves.

The local name for *R. arabica* in Dhofar is 'estah'. All parts of the plant are edible but it is particularly prized for its sweet tasting edible rootstocks which are dug up, peeled and eaten raw.

***Blepharis dhofarensis* A. G. Miller, sp. nov.** Fig. 2.

Ab omnibus aliis speciebus huius generis habitu diverso differt (frutex, vel arbor debilis, est). *B. longispica* C. B. Clarke a speciei nova floribus in capitulis elongatis (non capitatis), marginibus foliorum perspinosis, habitu humiliore valde recedit.

Shrub or weak tree to 5 m tall. *Stems* spindly, branched throughout, internodes 8–15 cm; old wood grey with prominent lenticels; new wood reddish brown, thinly covered with appressed antrorse hairs. *Leaves* opposite or arranged in whorls of four, borne on short axillary side shoots, narrowly elliptic, 5–18 × 1–4.5 cm, tip acute or obtuse ending in a weak spine, margin entire or somewhat repand often with a few weak spinose teeth, base attenuate into a short c. 1 cm petiole bearing a pair of spinules; thinly hairy with short appressed, antrorse hairs. *Inflorescence* terminal, ± capitate, densely contracted, 8–10-flowered, 5–6 cm long, on 6–15 cm peduncles; subtended by a whorl of 4, leaflike bracts. *Bracts* c. 20: middle and upper broadly obovate to ± rhomboidal, tip abruptly



FIG 2. *Blepharis dhofarensis*: a, flowering shoot $\times \frac{2}{3}$; b, leaf $\times \frac{2}{3}$; c, corolla viewed from above with 2 bracteoles $\times \frac{2}{3}$; d, flower subtended by bract and bracteole $\times \frac{2}{3}$; e, flower subtended by a bract (reflexed) and 2 bracteoles $\times \frac{2}{3}$; f, base of corolla opened to show attachment of stamens and gynoecium $\times 1\frac{1}{2}$; g, anterior anther $\times 2$; h, posterior anther $\times 2$; i, fruit $\times \frac{2}{3}$; j, dehiscent fruit $\times \frac{2}{3}$; k, seed after wetting showing mucilaginous hairs $\times \frac{2}{3}$.

acuminate ending in a spine, margin towards base entire in upper half with 6-11 pairs of spines; lower bracts sterile, broadly ovate, tip acuminate ending in a spine, margin with 5-10 pairs of spines; tomentose with dense short hairs, shortly stalked glandular hairs and longer spreading hairs. *Bracteoles* 2 per bract, \pm absent in lower sterile bracts, linear-lanceolate 30-34 \times c.15mm, ending in a spinose tip, sericeous with long antrorse hairs. *Calyx* divided almost to base, finely and antrorsely sericeous, segments very unequal; posterior segment ovate, 30 \times 12mm, acute, ending in a weak spine; anterior segment similar to posterior, 32 \times 10mm, ending in a pair of weak spines; 2 lateral segments ovate, 16 \times 6mm, acuminate. *Corolla* 1-lipped, 40-55mm long; tube c.8mm long, glabrous outside, with a ring of hairs at mouth inside; posterior lobe absent; anterior lobe white, 30-35mm long, finely sericeous, 5-lobed: terminal lobe broadly ovate, retuse, 10 \times 12mm, rounded; lower lateral lobes oblong, 5 \times 3mm, rounded. *Stamens* 4, exserted, attached at the mouth of the corolla tube; filaments c.10mm, with a small tooth above attachment of anthers; anthers c.8mm, anterior \pm fixed, posterior \pm versatile. *Ovary* ovoid, glabrous with two small glands at the base of the style; style c.15mm, glabrous; stigma shortly 2-fid. *Capsule* flattened oblong-ovoid, c.12 \times 8mm and 2-3mm deep, on short stalk c.0.5mm long, surmounted by the remains of the style c.3mm long, glabrous, yellow-brown below to reddish brown above. *Seeds* ovate, flattened, with an unequally angled base, c.7 \times 9mm, white or whitish brown, covered with appressed hairs which swell to c.5mm long and become mucilaginous on wetting.

Type: Oman, Dhofar, Wadi Gerzid, 2000ft, 1895, *Bent* 110 (holo. K).

SULTANATE OF OMAN. Dhofar, J. Qara, c.15km SE of Jibjat, dry rocky wadi with *Anogeissus*, *Commiphora* scrub, 900m, 30 ix 1979, *Miller* 2368 (E); J. Qara, Salalah to Thumrit road, Ayun turnoff, gully with *Anogeissus*, *Ruttya* etc., 700m, 5 x 1979, *Miller* 2552 (E, K); J. Qara, monsoon forest, on escarpment, 27 x 1943, *Vesey-Fitzgerald* 12740/4 (BM); J. Qara, 1985, *Morris* 84 (E); J. Qara, 17°10'N 54°05'E, escarpment woodland with *Anogeissus* & *Euclea*, 24 i 1983, *R. M. Lawton* 2447 (K).

B. dhofarensis is frequent at middle and higher altitudes in the wet escarpment mountains, growing in the *Anogeissus dhofarica* woodland together with *Ruttya fruticosa*, *Euclea schimperi* etc. It flowers after the mists have lifted in November and December.

Within *Blepharis* the affinities of the species are not clear. It appears to be the only species reaching the stature of a small tree and is clearly distinctive for this reason. It is also distinguished by its spiny, capitate heads of white flowers and leaves which are unarmed or bear only a few spinose teeth along the margins. It is probably most closely related to two S African species: *B. hirtinerva* T. Anders, a more spiny-leaved plant of lower stature, and *B. longispica* which has flowers in elongate not capitate spikes and leaves with a pronounced spinose margin. In Clarke (*Flora of Tropical Africa* 5:95 (1900)) it keys to *B. asteracantha* C. B. Clarke which has blue flowers, narrow leaves and attains a height of only c.30cm, and to *B. sol* C. B. Clarke which has yellow flowers. The only other species

which apparently reaches the proportions of *B. dhofarensis* is *B. capensis* Pers., another S African species, which grows to 2m tall; this is, however, an intricately branched and much more spiny plant.

***Dyschoriste dalyi* A. G. Miller, sp. nov. Fig. 3.**

A *D. radicans* (Hochst.) Nees corolla maiore (16–20mm, non 10–13mm, longa), floribus in axillis foliorum 1(–2), non 2 vel aliquot, foliis distincte undulatis, et indumento foliorum juniorum dense tomentoso, vetustiorum glabrescenti differt.

Decumbent, \pm woody-based perennial. *Stems* prostrate, up to 75cm long, often rooting at the nodes, 4-ridged, covered with linear sclereids running parallel with the axis, glabrous or with short crisped hairs mainly on the ridges. *Leaves* ovate to obovate, 10–40 \times 3–20mm, tip acute or obtuse, margin entire and somewhat undulate, base attenuate, petiole 1–8mm, densely white tomentose when young, becoming glabrous with age, linear sclereids conspicuous when dry. *Flowers* 1(–2) in the axils of the leaves, subtended by 2 bracteoles. *Bracteoles* narrowly obovate, 3–7 \times 0.75mm. *Calyx* tubular, 13–17mm long, with 5 subequal linear lobes, in flower fused in bottom third, divided almost to base in fruit, thinly tomentose to glabrescent. *Corolla* mottled pale pinkish-purple with darker markings in throat, 16–20mm long, 2-lipped, thinly tomentose externally, glabrescent internally; tube 12–15mm long, in lower half cylindrical, in upper half widening; posterior lip 2-lobed, lobes rounded to retuse c.3.5 \times 3mm; anterior lip 3-lobed, lobes oblong rounded to retuse c.6 \times 3mm. *Stamens* 4, didynamous, exserted, attached in upper part of corolla tube; filaments fused in pairs each with one long and one short filament, fused part flattened, c.2mm long, anther thecae shortly spurred at base. *Ovary* glabrous; style c.12mm long, hairy; stigma curved. *Capsule* narrowly oblong, 7–9 \times c.2mm, tip rounded with a short \pm square apex with a gland on either side, glabrous, pale brown with darker brown stripes. *Seeds* (immature) \pm circular, c.1.5mm, pale brown, densely covered with white hairs.

Type: Oman, Dhofar, Jebel Qara, c.15km SE of Jibjat, dry rocky wadi with *Anogeissus dhofarica*, *Commiphora* spp. scrub, creeping perennial, flowers pale lilac-purple, throat striped, 900m, 30 ix 1979, A. G. Miller 2377 (holo. E, iso. K).

SULTANATE OF OMAN: Dhofar, Medinet Alsam, 30 x 1984, I. M. McLeish 279 (E); J. Qara, Thumrit to Salalah road, Ayun turnoff, grassland and rocky slopes, *Euphorbia balsamifera* zone, 800m, 25 ix 1979, Miller 2200 (E, K); 43km N of Salalah on the Thumrit road, near Aqabat al Hatab, 600m, 21 ix 1977, Radcliffe-Smith 5128 (K); Qairoon Hairitti, 850m, 3 x 1984, R. E. Ash 120 (E); Hargeif, 17°14'N 54°02'E, grassland, 10 viii 1983, Lawton 2480 (E); J. Qara, Kaftawt ridge, c.1000m, x 1984, Morris 385 (E); J. Qamr, Sarfait, rocky places above Khaleef zone, c.1000m, 11 x 1979, Larsen in Herb. Miller 2689a (E); Dhofar mountains, 1895, Bent 184 (K).

Dyschoriste dalyi occurs commonly in open rocky habitats in the upper parts of the escarpment woodlands and on the summit grasslands of the escarpment mountains. It is probably most closely related to *D. radicans* (Hochst.) Nees; both are decumbent herbs and similar in facies. *D. dalyi* is

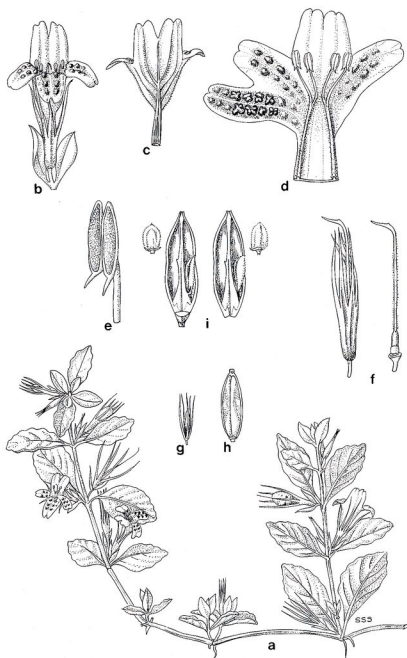


FIG. 3. *Dyschoriste dalyi*: a, habit $\times \frac{1}{3}$; b, flower $\times 1\frac{1}{3}$; c, corolla $\times 1\frac{1}{3}$; d, corolla opened to show attachment of stamens $\times 2$; e, anther $\times 10$; f, calyx with corolla removed and gynoecium $\times 2$; g, fruiting calyx $\times \frac{1}{2}$; h, fruit $\times 2$; i, dehiscent fruit with seeds $\times 3$.

most immediately distinguished by its larger corollas (16–20 versus 10–13mm long), the solitary, or at most paired, flowers in the leaf axils and differences in indumentum. The closest species of *Dyschoriste* geographically is *D. longicalyx* a little known plant from S Yemen. This is however totally different; it has smaller corollas (c.1cm long), several flowers in the axils of each leaf and triangular not linear calyx lobes. It also appears to be an erect, not decumbent, herb. I have pleasure in naming *D. dalyi* after Mr Ralph Daly, the Adviser for Conservation of the Environment in Oman, who has sponsored much botanical research in Oman.

***Withania qaraitica* A. G. Miller & J. A. Biagi, sp. nov. Fig. 4A.**

Habitu similis *W. riebeckii* Schweinfurth et *W. adunensis* Vierhapper, sed calycibus in statu fructifero late patentibus (non erectis), staminibus brevioribus ad basin tubi corollae portatis, seminibus alveolatis foveis c.0.3–0.4mm diam. differt.

Shrubby perennial herb up to 1m tall, often woody based; stems branched throughout, densely tomentose with whitish stellate hairs. *Leaves* ovate, 4–14 × 2–8cm, tip acute to obtuse, margin entire or repand, base obtuse to truncate often unequal, tomentose with stellate hairs becoming glabrescent with age; petiole 1–3cm long, densely tomentose. *Flowers* in axillary, 3–6-flowered clusters; pedicels 4–6mm, densely tomentose. *Calyx* funnel-shaped, 4.5–6mm long (at anthesis), accrescent in fruit, densely tomentose externally; lobes triangular, 1–2 × 1–2mm, tip acute. *Fruiting calyx* up to 2cm diam., glabrescent within, thinly tomentose externally, lobes spreading, up to 8mm long. *Corolla* pale whitish green, dark green at centre, broadly campanulate, 5–7mm long, thinly tomentose externally, glabrous within except for five patches of hairs at base; lobes triangular, 1.5–2 × 1.5–4mm, acute, somewhat reflexed. *Stamens* attached to base of corolla tube; anthers oblong-ovate, c.1mm long; filament c.0.8mm long. *Ovary* ovoid, 2mm long × 1.5mm diam., style c.1.5mm long, stigma capitate. *Fruit* green, ripening bright orange-red, glossy; globose, 4–8mm diam., not enclosed by the persistent spreading green calyx. *Seeds* trigonous to somewhat reniform, slightly compressed, 2–3.5 × 2–2.5mm, alveolate with pits 0.3–0.4mm across, pale yellowish brown.

Type: Oman, Dhofar, cliff tops of Ras Hamar, 15km W of Salalah, degraded woodland dominated by *Commiphora* spp., *Blepharisperrum hirtum* and *Euphorbia jatrophioides*, shrubby perennial on cliff, flowers (going over) pale whitish green with green centre, fruits ripening red, 80m, 8 ix 1985, Miller 7528 (holo. E; iso. K, MUSCAT, UPS).

SULTANATE OF OMAN: Dhofar, Wadi Hinna E of Taqah, 150m, 30 v 1985, Miller 7040 (E, K, MUSCAT); J. Qara, Ain Sahalnawt, N of Salalah, 50m, 5 viii 1985, Miller 7260 (E, K, MUSCAT); Ain Garzeez, 17°05'N 54°05'E, 11km from Salalah on Ayun road, 14 xi 1984, I. M. McLeish 350 (E); J. Qara, wadi Hinna, wet escarpment woodland, 100m, 28 vii 1985, Miller 7138 (E, K, UPS, MUSCAT).

W. qaraitica is common in the wet, monsoon affected woodlands of the escarpment mountains where it is frequently found growing on small cliffs. It has so far been recorded only from Dhofar but like most of the

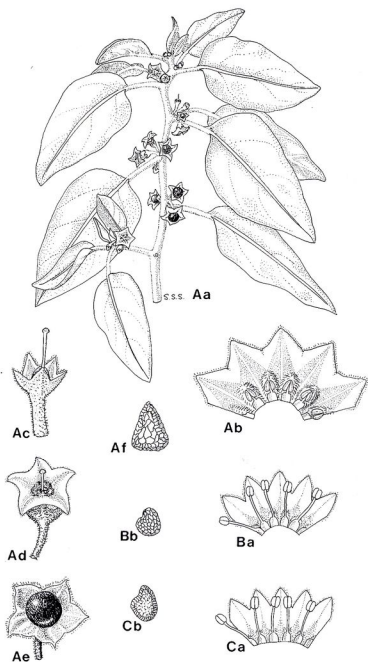


FIG. 4. *Withania qaraitica*: Aa, flowering and fruiting shoot $\times \frac{2}{3}$; Ab, corolla $\times 3$; Ac, calyx with ovary $\times 3$; Ad, young fruiting calyx $\times 3$; Ae, fruiting calyx $\times 3$; Af, seed $\times 4$. *W. riebeckii*: Ba, corolla $\times 3$; Bb, seed $\times 4$. *W. adunensis*: Ca, corolla $\times 3$; Cb, seed $\times 4$.

other woodland endemics in Dhofar will, almost certainly, turn up in the extension of the woodland in the PDRY.

Withania qaraitica is most closely related to the Socotran endemics *W. riebeckii* Schwienfurth and *W. adunensis* Vierhapper, and closely resembles them in facies. *W. qaraitica*, however, can be distinguished in a number of ways, perhaps the most obvious difference being in the fruiting calyx: in *W. qaraitica* this is enlarged and spreading in fruit so that the berry is completely exposed, whereas in both *W. riebeckii* and *W. adunensis* the calyx is erect in fruit and partly conceals the berry. In *W. qaraitica* the stamens are very short, the filaments being c.1mm long and the anthers held at the bottom of the corolla; in the Socotran species (Fig. 4Ba, Ca) the filaments are 2–3.5mm long and the anthers are held at a level with the sinuses between the calyx teeth. In all three species the seeds are ornamented with rounded alveoli and there seems to be constant differences between them in the size of these alveoli: *W. qaraitica*—seed 2–3.5 × 2–2.5mm, alveoli 0.3–0.4mm across (Fig. 4Af); *W. riebeckii*—seed c.1.5–1.75 × c.1.25mm, alveoli 0.1–0.2mm across (Fig. 4Bb); *W. adunensis*—seed c.2–2.5 × c.2mm, alveoli c.0.1mm across (Fig. 4Cb). Only one other species, *W. somnifera*, occurs in Arabia. This can be immediately distinguished by its fruits which at maturity are totally concealed by the inflated and membranous accrescent calyx. In Dhofar no distinction is made between *W. dhofarense* and *W. somnifera* and both are locally used for their medicinal properties.

***Hyoscyamus gallagheri* A. G. Miller & J. A. Biagi, sp. nov.** Fig. 5.

A *H. insano* Stocks habitu humili caespitoso, foliis anguste obovatis integris, indumento breviter tomentoso differt.

Succulent, woody-based perennial forming clumps up to 1m across by up to 30cm tall; stems little-branched, decumbent to ascending, covered with remains of old leaves below, densely tomentose with short branched hairs and glandular hairs. *Leaves* whitish green, crowded, sometimes ± in rosettes, narrowly obovate, 3–8.5cm (including petiole) × 0.5–1.2cm, tip acute, margin entire, base long attenuate into undifferentiated petioles, densely and shortly tomentose. *Flowers* in ascending racemes up to 10cm long, sweetly scented; pedicels c.10mm long lengthening to 25mm in fruit, shortly tomentose. *Calyx* tubular-campanulate, 22–33mm long, accrescent in fruit, 5-lobed; lobes more or less unequal with uppermost largest, broadly rounded-triangular, 2–5 × 3–8mm, acute to obtuse, shortly tomentose. *Fruiting calyx* broadly campanulate, 2.5–4cm long, papery. *Corolla* pale mauve with yellow markings in the throat, funnel-shaped, 4–5cm long, 2-lipped, 5-lobed, glabrous; lobes unequal, broadly ovate-triangular, the 2 lower smaller than the 3 upper, 4–10 × 5–11mm. *Stamens* exerted from corolla tube, filaments attached towards base of tube, free part of filament c.2cm long, anther c.0.6mm long. *Ovary* ovoid, style c.4cm long, stigma capitate. *Fruit* obovoid, 8–15 × 5–8mm. *Seeds* ovoid, compressed, 1–1.5 × 1 × 0.8mm, reticulately alveolate, pale reddish brown. Type: Oman, Sahel al Jazir, Rima to Ras Madraka road, Khor Dirrif, 18°56'N 57°20'E, low sand dunes, forming grey-green, succulent clumps, c.1m across, 20–25cm high, flowers pale mauve, yellow dotted in throat, sea-level, 1 x 1984, A. G. Miller 6509 (holo. E; iso. K, MUSCAT, UPS).

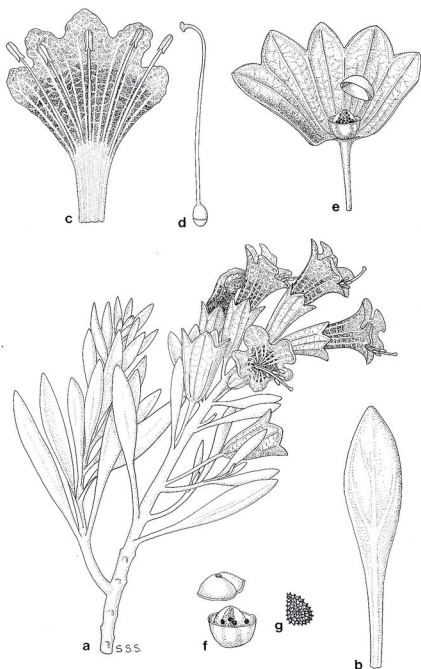


FIG. 5. *Hyoscyamus gallagheri*: a, flowering and fruiting shoot $\times \frac{1}{3}$; b, leaf $\times \frac{2}{3}$; c, dissected corolla $\times \frac{2}{3}$; d, gynoecium $\times \frac{2}{3}$; e, fruiting calyx and fruit $\times \frac{2}{3}$; f, fruit $\times 1\frac{1}{2}$; g, seed $\times 7$.

SULTANATE OF OMAN: Sharbithat, 17°56'N 56°01'E, low limestone plateau, 10m, 29 ix 1984, *Miller* 6465 (E); Dhofar, on limestone plateau above Sharbithat, 18°00'N 56°27'E, 100m, 29 ix 1984, *Miller* 6467 (E); Plateau above Sharbithat, 18°07'N 56°27'E, 200m, 10 v 1983, *M. D. Gallagher* 6749 (E, MUSCAT); Sharbithat, 20m, 14 x 1979, *Miller* 2752 (E); Coast nr Ras Madraka, Khor Dirif, 18°56'N, 57°21'E, sea level, 25 iii 1986, *K. Stanley-Price* 279 (E).

H. gallagheri is found on the open limestone plateau above Sharbithat up to altitudes of about 200m growing with *Taverniera multinoda* Thulin and *Pulicaria pulvinata* Gamat-Eldin. It also occurs along the coast on sand dunes growing with *Zygophyllum* sp., *Arthrocnemum macrostachyum*, *Limonium stocksii*, *Atriplex coriacea* Forssk. and *Salcola rubescens* Franch. This region of central Oman is extremely arid, receiving only spasmodic rain and probably obtaining most moisture from the frequent mists which roll in from the Indian Ocean particularly in spring and autumn.

This distinctive new species was first collected during a brief visit to Sharbithat in 1979, when it was found scattered over the limestone plateau above the village. No flowers were seen but old fruits were present. Michael Gallagher of the Museum of Natural History of Oman visited the area again in 1983 to try to obtain flowering material but again only fruiting material was found, and it was not until 1984, on a further trip with Michael Gallagher, that flowering material was collected. The species is unusual in the genus because of its woody-based clump-forming habit with the crowded succulent leaves often appearing rosetted. The narrowly linear-obovate and entire leaves are unique in the genus, all other species having variously toothed or at least sinuately margined leaves. Perhaps the species closest to *H. gallagheri* is *H. insanus* Stocks. This differs in having a taller, more open habit, sinuate-dentate leaves, and a longer, glandular-villous (not shortly and densely tomentose) indumentum on the stems and pedicels.

ACKNOWLEDGEMENTS

We would like to thank the authorities of the Kew herbarium (K) for the loan of material. We are also grateful to Dr Robert Mill for the Latin diagnoses and Mrs Susanna Stuart-Smith for the illustrations.

Note: The Herbarium at The Natural History Museum, P.O. Box 668, Muscat, Sultanate of Oman, cited as MUSCAT above, has been designated the herbarium code ON for the forthcoming, 8th edition, of *Index Herbariorum*.